CLAIMS

What is claimed is:

1. A sensor arrangement comprising:

a plurality of row lines arranged in a first direction;

a plurality of column lines arranged in at least a second direction;

a plurality of sensor arrays arranged in crossover regions of the row lines and the column lines, each of the plurality of sensor arrays having:

at least one coupling device for electrically coupling a respective row line to a respective column line; and

a sensor element assigned to the at least one coupling device, wherein the sensor element influences electric current flow through the at least one assigned coupling device;

a detector electrically coupled to a respective end section of at least a portion of the row lines and of at least a portion of the column lines, the detector detecting a respective accumulative current flow from the individual electrical current flows provided by the sensor arrays of the respective lines; and

a decoding device coupled to the row lines and the column lines, the decoding device evaluating at least a portion of the accumulative electric current flows fed to the decoding device via the row lines and the column lines to determine at which of the sensor elements a sensor signal is present.

2. The sensor arrangement as claimed in claim 1, wherein the decoding device is divided into a row decoding device, to which accumulative electric current flows of the row lines are fed, and a column decoding device, to which accumulative electric current flows of the column lines are fed,

the row decoding device determining, from at least a portion of the accumulative electric current flows of the row lines independently of the accumulative current flows of the column lines, information about those sensor elements at which a sensor signal is possibly present;

the column decoding device determining, from at least a portion of the accumulative electric current flows of the column lines independently of the accumulative current flows of the row lines, information about those sensor elements at which a sensor signal is possibly present; and

the decoding device determining, from joint evaluation of the information determined by the row decoding device and the column decoding device, those sensor elements at which a sensor signal is present.

3. The sensor arrangement as claimed in claim 1, wherein the decoding device determines those sensor elements at which a sensor signal is present by:

Fourier transforming time-dependent accumulative current flows of the row lines and of the column lines;

multiplying together in pairs the Fourier-transformed accumulative current flows of the row lines and of the column lines; and

inverse Fourier transforming the accumulative current flows multiplied together in pairs.

4. The sensor device as claimed in claim 1, wherein the decoding device determines whether a sensor signal is present at a sensor element by using at least one accumulative current flow of at least one adjacent row line and/or of at least one adjacent column line.

5. The sensor arrangement as claimed in claim 1, wherein the decoding device determines whether a sensor signal is present at a sensor element, by using at least one predetermined temporal and/or spatial reference signal.

6. The sensor arrangement as claimed in claim 5, wherein the at least one predetermined temporal and/or spatial reference signal is adapted to the determined sensor signal.

7. The sensor arrangement as claimed in claim 5, wherein at least two temporal and/or spatial reference signals are adapted to the determined sensor signal.

8. The sensor arrangement as claimed in claim 1, wherein the decoding device determines whether a sensor signal is present at a sensor element at a second instant, by using a predetermined item of reference information about sensor signals at a first instant, which first instant temporally precedes the second instant.

9. The sensor arrangement as claimed in claim 1, wherein the decoding device is configured as a maximum likelihood sequence estimation decoder or as a maximum a posteriori decoder.

10. The sensor arrangement as claimed in claim 1, further comprising a voltage source, which is coupled to at least a portion of the row lines and of the column lines such that a predetermined potential difference is provided for at least a portion of the coupling devices.

11. The sensor arrangement as claimed in claim 1, wherein the at least one coupling device is a current source controlled by the associated sensor element or a resistor controlled by the associated sensor element.

12. The sensor arrangement as claimed in claim 1, wherein the at least one coupling device has a detection transistor having a first source/drain terminal coupled to one of the row lines, a second source/drain terminal coupled to one of the column lines, and a gate terminal coupled to the sensor element assigned to the at least one coupling device.

13. The sensor arrangement as claimed in claim 1, wherein the at least one coupling device has a calibration device for calibrating the at least one coupling device.

14. The sensor arrangement as claimed in claim 1, wherein the at least one coupling device has a deactivation function.

15. The sensor arrangement as claimed in claim 13, wherein the calibration device has a calibration transistor having a first source/drain terminal coupled to the respective row line, a second source/drain terminal coupled to the gate terminal of the detection transistor and also to a capacitor coupled to the assigned sensor element, and a gate terminal coupled to a further column line, and an electrical calibration voltage is applied to the gate terminal of the calibration transistor by means of the further column line.

16. The sensor arrangement as claimed in claim 1, wherein the at least one coupling device has an amplifier element for amplifying individual electric current flow of the at least one coupling device.

17. The sensor arrangement as claimed in claim 16, wherein the amplifier element has a bipolar transistor having a collector terminal coupled to the respective row line, an emitter terminal coupled to the respective column line, and a base terminal coupled to the second source/drain terminal of the detection transistor.

18. The sensor arrangement as claimed in claim 1, wherein at least a portion of the row lines and of the column lines have an amplifier device for amplifying the accumulative electric current flow flowing in the respective row lines and column lines.

19. The sensor arrangement as claimed in claim 1, wherein at least a portion of the row lines and/or of the column lines have a sample/hold device for storing the accumulative electric current flow flowing in the respective row lines and/or column lines at a predeterminable instant.

20. The sensor arrangement as claimed in claim 1, wherein at least one sensor element is an ion-sensitive field-effect transistor (ISFET).

21. The sensor arrangement as claimed in claim 1, wherein at least one sensor element has a MOSFET.

22. The sensor arrangement as claimed in claim 1, wherein at least one

sensor element is a sensor which is sensitive to electromagnetic radiation.

23. The sensor arrangement as claimed in claim 1, wherein the plurality of sensor arrays are formed essentially in rectangular fashion.

5

24. The sensor arrangement as claimed in claim 23, wherein the row lines form essentially a right angle with the column lines.

25. The sensor arrangement as claimed in claim 1, wherein the sensor arrays
10 are formed essentially in honeycomb-shaped fashion.

26. The sensor arrangement as claimed in claim 25, wherein the row lines form an angle of 60° with the column lines, and wherein different column lines are either parallel to one another or form an angle of 60° with one another.

15

27. The sensor arrangement as claimed in claim 1, wherein the sensor arrangement is divided into at least two regions that can be operated independently of one another, and it is predetermined which of the at least two regions is operated.